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Compact Fluorescent Lighting – Waste Reduction and Energy Savings

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Conserving resources improves the environment, both near and far. So where can you start?

How about replacing your incandescent light bulbs with compact fluorescent lights? Besides reducing the number of light bulbs you throw out, you will be reducing your household energy needs and your energy bills. Farther from home, you'll be reducing the energy needed to manufacture and transport incandescent bulbs, as well as the energy needed to haul those burnt-out, short-lived bulbs away for disposal.

"If everyone in the U.S. switched to compact fluorescent lighting, we could close half of our 150 nuclear power plants." – Rocky Mountain Institute

In 2000, there were almost 2.5 million housing units in Washington state. If each household replaced one 100-watt incandescent bulb with a 27-watt compact fluorescent (which provides the same amount of light), we would save 400 million kilowatts of electricity. That's enough electricity to power more than 11,000 Northwest homes. And we would avoid disposing of almost 2 million light bulbs every year.

Energy Efficiency with Lighting

Lighting accounts for 20 to 25 percent of all electricity consumed in the United States. Lighting consumes 20 to 30 percent of the total energy used by commercial establishments. An average household dedicates 5 to 10 percent of its energy budget to lighting.

In a typical residential or commercial lighting installation, 50 percent or more of the energy is wasted by obsolete equipment, inadequate maintenance or inefficient use.

Saving lighting energy requires either reducing electricity consumed by the light source or reducing the length of time the light source is on. This can be accomplished by:

- Lowering wattage by replacing lamps or entire fixtures.
- Reducing how long a light source is on, which means improving lighting controls and educating users to turn off unneeded lights.
- Replacing electric lights with natural light, called "daylighting," which reduces energy consumption.
- Performing simple maintenance to preserve illumination and light quality and allow lower initial illumination levels.

Compact fluorescent

Compact fluorescent lamps (CFLs) are the most significant lighting advance developed for homes in recent years. They combine the efficiency of fluorescent lighting with the convenience and popularity of incandescent fixtures.

CFLs can replace incandescents that are roughly three to four times their wattage, saving up to 75 percent of the initial lighting energy. Although CFLs cost more than comparable incandescent bulbs, they last 10 to 15 times as long. This energy savings and superior longevity make CFLs one of the best energy efficiency investments available.

When introduced in the 1980s, CFLs were bulky, heavy and too big for many incandescent fixtures. However, newer models with lighter electronic ballasts are only slightly larger than average incandescent lamps they replace.

CFLs come in integral and modular designs. Integral CFLs have a ballast and a lamp in a single disposable unit. Modular designs feature separate ballast that serves about five lamp replacements before it wears out.

Electricity cost savings (with CFL's) - based on three hours of use per day

Kilowatt Hour Rate	6¢	8¢	10¢	12¢	14¢	16¢	18¢	20¢	22¢
Energy Cost Savings Over 10,000 Hour Bulb Life	$33	$44	$55	$66	$77	$88	$99	$110	$121

Cost Comparison Chart	27-Watt Compact Fluorescent	100-Watt Incandescent
Cost of Lamps	$14	$0.50
Lamp Life	1642.5 days (4.5 years)	167 days
Annual Energy Cost	$5.91	$21.90
Lamps Replaced in 4.5 years	0	10
Total Cost	$40.60	$103.55
Savings Over Lamp Life	$62.95	$0

This table assumes the light is on for 6 hours per day and that the electric rate is 10 cents per kilowatt-hour.

Compact fluorescent lamps are most cost-effective and efficient in areas where lights are on for long periods of time. You may see a slower payback in areas where the light is turned on and off often, or where they are on for only a few minutes, such as closets and pantries. Because compact fluorescents do not need to be changed often, they are ideal for hard-to-reach areas.

Recently, some compact fluorescent lamps have been made to work with dimming switches. However, most cannot be dimmed. Although most compact fluorescents fit into an existing 3-way light socket, only a few special models can light to more than one level.

Compact fluorescent lamps are designed to operate within a specific temperature range. Temperatures below the range cause reduced output. Most are for indoor use, but there are models available for outdoor use. You can find a compact fluorescent lamp's temperature range on most lamp packages. You should install outdoor compact fluorescents in enclosed fixtures to minimize problems from colder temperatures.

In addition to their higher initial cost, compact fluorescent lamps are usually physically larger than incandescent lamps. This may make them difficult to use in some light fixtures. Fluorescent tubes also contain a microscopic amount of mercury. While it is such a small amount that disposal is not usually regulated (as with full-size fluorescents), you should use caution to avoid crushing the tubes and to dispose of them safely.

To purchase compact fluorescent lamps, check in your telephone business directory under the headings Lighting or Electrical Equipment and Supplies. You can also try the better-stocked home centers, building supply houses and hardware stores.

U. S. Department of Energy
Energy Efficiency & Renewable Energy Network
Consumer Energy Information: EREC Fact Sheets, Compact Fluorescent Lights
http://www.eren.doe.gov/consumerinfo/refbriefs/ef2.html

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Energy Efficiency & Renewable Energy Network
Consumer Energy Information: EREC Fact Sheets, Energy Efficient Lighting
http://www.eren.doe.gov/erec/factsheets/eelight.html

Lighting Center @ NorthWest Builders Network
Energy Efficient Lighting Fixtures, Lamps & Luminaries
http://www.nwbuildnet.com/stores/bm/lighting/index.html.